SOIL SURVEY OF THE CHARLESTON AREA, SOUTH CAROLINA.

By F. E. BONSTEEL and E. P. CARR.

LOCATION AND BOUNDARIES OF THE AREA.

The Charleston area, South Carolina, is included between the meridians 79° 50′ and 80° 20′ west longitude, and the parallels 32° 30′ and 32° 45′ north latitude, and lies mostly within Charleston County, a small portion lying within Colleton County. It is bounded on the east by the Cooper River and Charleston Harbor channel, on the south by the Atlantic Ocean, on the west by South Edisto River, and on the north by a line which is an extension of the Bees Ferry road, being nearly parallel with the coast and extending from the con-

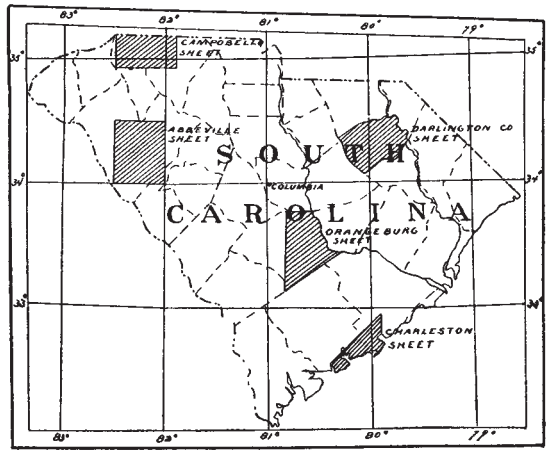

Fig. 7.—Sketch map showing location of the Charleston area, South Carolina.

fluence of the South Edisto and Dawho rivers to Cooper River. The area varies from 12 to 14 miles in width and from 30 to 36 miles in length, comprising about 430 square miles, of which about 352 square miles is land surface, and extending from Charleston Neck southward along the coast, including the sea islands.

The area is traversed in every direction by many salt-water channels, most of which are navigable for vessels of medium draft. Charleston, with a population of 55,000, about 25,000 of whom are

whites, is the commercial center of the area, and its only town. Charleston has a fine harbor for vessels of deep draft and offers exceptional port facilities. Its importance as a port has not been recognized, and the volume of shipping is not commensurate with the natural advantages. There are few whites in the remainder of the area, the colored population being very largely in excess.

The base map used in the soil survey was constructed by plane-table traverse by the party in the field. The coast and some of the stream boundaries were adapted from Chart No. 154 of the United States Coast and Geodetic Survey.

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

The settlement of Charleston and the neighboring coast area can be definitely traced to a band of colonists sent out from England in 1670 by the Lords Proprietor, to whom Charles I had granted the territory known as "Carolina."

These colonists first touched at Port Royal, but fear of the hostile Spaniards impelled them to seek a settlement farther north, and in April, 1670, they landed at Albemarle Point, on the Ashley River, just opposite the present site of Charleston, naming their settlement Charles Town.

During the following year the present site of Charleston was selected and laid out, and the settlement was transferred to the new location. The number of colonists at this time was about 200. Those who came later were chiefly political or religious refugees. Following the revocation of the edict of Nantes, in 1685, a great many French Hugenots came to the colony.

Commercial relations with the English markets were established soon after the settlement had been made, and among the articles exported were potatoes, indian corn, and tobacco together with hides, ship timber, and naval stores. Lumbering became a leading industry in later years.

Rice was introduced in 1691, with seed from Madagascar, and proved very successful. The rice was first grown on inland swamps, where its cultivation continued for 75 years. By this time the superiority of the reclaimed tidal swamps along the rivers in the upper portions of the area, due to better control of irrigation and drainage, had been discovered, and the culture was transferred accordingly.

The preparation of the rice for market in the early days was very laborious, entailing the use of a flail and a pine-stump mortar and pestle for separating the grain and cleaning the seed. The first water mill for milling rice was erected in 1787 and a steam mill was established in 1817. The milling of rice continues to be a leading

industry of Charleston, but the main areas of rice soil lie just outside the limits of the present survey.

The Carolina colony was affected by the widespread early colonial interest in silk culture, but although the culture involved no special agricultural difficulties the venture was not an economic success, not paying so well as rice and cotton.

The cultivation of indigo was introduced in 1741, and was encouraged by a parliamentary bounty of 6d. per pound. After the Revolution the industry became unprofitable without the bounty, and was superseded by the more profitable culture of cotton.

Cotton was found to do well from the first, and was exported as early as 1784. The Sea Island cotton was first grown in this area in 1790, from Georgia seed. The plant had originated, however, in the West Indies. Until 1828 its culture was largely a process of experiment and development, and great care was necessary in order to insure success. In 1842 a production of 20,000 bags was reported. The industry was prostrated by the civil war, and at one time all the seed from which the present product of Sea Island cotton has been derived was contained in an ordinary envelope.[a] More recently a variety has been secured which yields about one-third more lint in proportion to seed cotton than the earlier varieties.

Tobacco has been continuously and successfully grown in the area, though some difficulty has been experienced with its curing.

The growing of early truck for Northern markets is a development of recent years, but has now become a flourishing industry. The labor problem resulting from the civil war has been worked out to a satisfactory solution. The laboring class is composed entirely of negroes.

The population of the area, including Charleston, may be estimated at 70,000, of which a considerable majority, especially in the rural districts, is colored.

CLIMATE.

The following table gives the normal monthly and annual temperature and rainfall for the Charleston station of the Weather Bureau, located in the eastern part of the area surveyed, and for the Summerville station, about 15 miles outside the northern boundary. It will be noticed that the rainfall is ample and well distributed. The temperature is mild in winter, and the heat of the summer months is tempered by the fresh sea breezes.

Damaging frosts are rare throughout the area in the growing season and snow seldom falls. The climate is favorable to the production of early truck, which matures at such a season as to follow the

[a] Charleston Yearbook.

bulk of the Florida shipments and to precede the earliest from the Norfolk, Va., region.

Normal monthly and annual temperature and precipitation.

Month.	Charleston.		Summerville.		Month.	Charleston.		Summerville.	
	Temperature.	Precipitation.	Temperature.	Precipitation.		Temperature.	Precipitation.	Temperature.	Precipitation.
	° F.	*Inches.*	° F.	*Inches.*		° F.	*Inches.*	° F.	*Inches.*
January	50.0	4.01	48.0	3.78	August	80.5	7.62	80.0	9.44
February	52.8	3.32	48.5	4.81	September	76.0	6.59	75.0	3.14
March	56.7	3.94	57.1	2.69	October	66.7	4.18	66.0	5.97
April	64.6	3.58	62.6	5.05	November	57.6	3.00	56.1	3.47
May	72.4	4.02	71.4	3.22	December	51.5	3.24	48.8	4.02
June	79.1	5.65	76.7	7 87	Year	65.8	56.74	64.1	59.16
July	81.8	7.59	79.2	5.70					

PHYSIOGRAPHY AND GEOLOGY.

The portion of Charleston County covered by the present survey comprises a strip of sea-border territory lying along the eastern edge of the South Atlantic Coastal Plain. The topography of the area is uniformly flat and low lying, the long, level stretches which reach to the sea front being only occasionally relieved by gentle ridges or hummocks a few feet in height, so that the difference in altitude within the area does not exceed 30 to 40 feet. The district differs, however, from many portions of the Atlantic border in that it is highly diversified by a system of waterways which forms within the area four considerable islands, and which gives it a distinct physiographic character. Various explanations have been given of the formation of these sea islands, but in view of their location at the mouths of the Cooper, Ashley and Edisto rivers, it seems safest to regard them as delta deposits.

This view is supported by the fact that these islands have a recognizable delta or triangular shape, and by the further fact that the margins on nearly all parts of the islands are higher than the inland areas, and indicate influences of river deposition. These margins were probably first formed in the nature of a bar by the combined action of ocean and river currents. This bar then served not only to deflect the course of the rivers southward, where further deposition would likewise be made, but also to form between the sand bar and river shore an eddy, in whose quieter currents the river could then lay down its finer deposits. Continued deposition would in time cause the eddy or lagoon to become a mud flat or salt marsh, which would then be further built up by vegetation, and drift sands from the sand bars. There have doubtless been other agencies to aid this work, such as a moderate emergence of the land, and the cutting in

of channels by the sea in times of storm. But that these islands constitute a delta plain, and were built up largely by river and tidal deposits, seems to be clear.

Besides the main rivers—Cooper, Ashley, and Edisto—there are numerous so-called rivers and creeks which are properly brackish tideways, serving to connect the different rivers or channels. The complexity of this water system serves not only to secure ready steamboat transportation to many parts of the area, but it has also a distinct agricultural value in preventing the injury of the truck and cotton crops by frost. The close proximity of the sea as affecting the climatic and crop conditions must not be overlooked, as it is a general experience that the best quality of Sea Island cotton grown in the area is produced on the lands that lie near the sea front.

Along the many tidal channels are found extensive stretches of salt marsh in varying stages of emergence. Most of these are covered with water at high tide, but some patches here and there have been left dry by changes in the channels, while others are in a half emerged state, in which they have been modified by washings from the shores or are gradually changed into fresh-water swamps. Wherever such marsh lands are situated far enough inland to allow of fresh water irrigation and proper drainage, they have been reclaimed and made into highly productive rice lands.

The sandy soils of the area follow generally the course of the slight ridges above referred to, except in the immediate neighborhood of the sea, where the soils are uniformly sandy. These ridges or hummocks of sand sometimes show clearly the course of an older beach line, and generally are derived from former sand bars or coarser current deposits. On the sea islands these ridges of sand are found more frequently near the margins of the islands; not, however, on the sheer front of the water channels, because here the sands have been somewhat eroded, and the soils are, as a rule, of heavier texture and used mostly for truck. But just behind these eroded and lower lying soils there is generally a well-defined rise of sand, following, and indeed often making, the outline of the island, just as it doubtless constituted the backbone of the island in its first formation. These higher ridges or sandy rises are used almost entirely for cotton.

As we pass farther inland the lands again become depressed and poorly drained, and it is in these inland areas that the large fresh-water swamps are found. These swamps rarely owe their origin to springs, but almost invariably to the uniformly high water table. These black, mucky swamp lands are thus generally confined by the higher lying sand areas, the waters of which seep out into them and are held as in an inland basin. They are much affected by conditions of season and rainfall.

In its geology the Charleston area consists of superficial strata of sand, mud, and clay, with a depth varying up to 60 feet, which stretch some 10 miles inland and thin out above tide water. These strata are marine depositions of Pleistocene or possibly later origin, the sediments being laid down upon the sea floor by the varying currents of a shallow sea and subsquently exposed by a slight elevation of the coastal region The delta plain formed by the sea islands is of more recent origin, the materials being largely these same emerged Pleistocene deposits reworked by the rivers.

These surface strata are underlain to a depth of from 600 to 700 feet by the Ashley and Cooper river marl beds of Eocene age. These marl beds were formed, as was the Eocene sea floor, from oyster and coral shells, just as similar beds are now forming farther off the coast. The upper portions of these marl beds now consist of nodules which represent fragments broken from the underlying beds and worn into nodular form by the mechanical action of the waters during the following uplift.

These marl beds originally contained some 60 per cent of carbonate of lime with only 2 to 4 per cent of phosphate of lime, but the upper beds of the waterworn fragments now contain 50 to 60 per cent of phosphate of lime and only 5 to 10 per cent of lime carbonate. The proportions of carbonate and phosphate of lime have thus been almost inverted, and these beds are now extensively mined for phosphatic fertilizers. The cause of this conversion of the carbonate of lime into phosphate has been a matter of considerable discussion, and need not be entered into here.

These phosphate beds outcrop here and there along the stream channels in the area, but for the most part are deeply covered and are profitably mined only to a depth of 20 feet.

SOILS.

Six distinct types of soil were recognized and mapped in this area. Only three of the types are extensively tilled, the remaining types being largely unfit for cultivation in their present condition.

The following table shows the total area and relative extent of each type mapped:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Galveston clay	77,312	34.3	Galveston fine sand	5,696	2.5
Norfolk fine sand	61,504	27.3	Norfolk sand	1,088	.5
Norfolk fine sandy loam	47,680	21.2	Total	225,344	
Portsmouth fine sandy loam	32,064	14.2			

NORFOLK FINE SAND.

The soil of the Norfolk fine sand is a light-brown or yellowish fine sand of great uniformity, varying from 6 to 18 inches in depth, and having an average depth of 12 inches. The surface is naturally very loose and incoherent, but becomes slightly loamy on cultivation. The particles composing it are so fine as to have a very flourlike feel, yet the type is decidedly a sand. Very little silt, clay, or coarse sand enters into its composition.

The subsoil to more than 36 inches is a pale yellow to bright orange or sometimes gray fine sand, loose and incoherent, and in the uncultivated areas differing but slightly from the soil in texture. It is usually moist or wet at from 18 inches to a few feet below the surface, and scattering iron concretions in quantities ranging up to 5 per cent are often present in both soil and subsoil.

This is an extensive type of soil widely distributed throughout the area surveyed and occurs in belts parallel to the seacoast or larger streams. The largest areas are just back from the present sea beaches, while the country farther inland than the present survey consists almost entirely of this type, in an uncleared condition, and fresh-water swamps.

The Norfolk fine sand occupies smooth, gentle ridges, having the highest elevation of any type in the area and adjoining streams and tide marshes, usually with abrupt bluffs sloping away inland to the sandy loam and swamp areas. Most of the fresh-water streams originate at the foot of these ridges from seepage, and consequently the sand is very generally separated from the other types by areas of marsh and Portsmouth fine sandy loam.

The Norfolk fine sand occurs at all elevations from tide level to the highest in the area, but is more generally found at the highest. It has the most rolling and marked topography of any type represented, except the Norfolk sand, and occasionally forms slight wind-blown dunes and hillocks.

Naturally this type is a light, well-drained, early soil, but throughout a large proportion of the areas, particularly on the sea islands, the elevation is so slight and the surface configuration of the country so level that the water table is never far from the surface, and the subsoil is often saturated at a depth of from 18 inches to 3 feet. The texture of both soil and subsoil favors free moisture movement, and the soil is very much benefited by underdrainage where the water table is too high. Deep-rooted crops, like the Sea Island cotton, particularly, demand underdrainage to secure the best results of which the soil is capable.

The Norfolk fine sand consists very largely of finely divided siliceous particles of marine deposition, laid down much as the Galves-

ton fine sand is being laid down as beaches by wave action, tide, and wind. The sediments have been but slightly modified since their removal from the influence of the sea. Rains have removed the salt, the oxidation of the iron has produced the more brilliant coloring, forming concretions in some cases, and the accumulation of vegetable matter on the surface has given the soil its light-brown color and slightly loamy texture. In other respects it closely resembles the Galveston sand of the present beaches along the Atlantic and Gulf coasts. Variations in different areas of the type are due almost entirely to cultivation and drainage, and exert a marked influence on crop yields.

Long staple or Sea Island cotton is the only crop of great importance, and it is on this type that the industry has chiefly been established. This important special crop will be fully considered in the chapter on agricultural conditions. Yields vary from 200 to 400 pounds per acre, 300 pounds being a fair average. Few of the intelligent planters fail to secure the latter yield in a good season, yet few exceed that amount with any regularity. From 500 to 1,500 pounds of commercial fertilizer is applied per acre to secure this yield. White potatoes are grown to some extent, this type being a little safer than the sandy loam, though generally not yielding quite so heavily. Average yields vary from 100 to 250 bushels per acre, inclining toward the lower figure. Sweet potatoes yield well, and are grown principally on this type both for market and for stock food. Asparagus is more extensively grown on this than on any other type in the area, but is much subject to rust, and the acreage is decreasing. All kinds of light truck are grown to some extent. Green peas and cowpeas are often planted in the cotton rows late in the season, and some oats and grass crops are produced. Recent experiments indicate that alfalfa would succeed well on this type, and its introduction should be encouraged as a valuable addition to the crops of the area, not only for profit but for its beneficial effect on this loose type of soil. Grass and grain crops withstand the heat of the summer season with difficulty.

The Norfolk fine sand is admirably adapted to the production of those crops which it is desired to force to an early maturity, and with the advantage of a salubrious climate and ample rainfall, offers unbounded opportunities to the intelligent market gardener and truck grower. With the introduction of alfalfa many areas too inaccessible for trucking and cotton planting would become valuable as grazing lands. Longleaf pine makes a fine growth, and in view of the increasing scarcity of that timber, forestry in this section promises large returns in the near future.

The following table shows the texture of typical samples of the soil and subsoil of this type:

Mechanical analyses of Norfolk fine sand.

No.	Locality.	Description.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
10676	Stiles Point, James Island.	Brown fine sand, 0 to 14 inches.	0.3	1.0	1.4	61.0	25.7	6.4	4.3
10674	Andells Bluff, Johns Island.	Brown fine sand, 0 to 12 inches	.1	.6	1.4	82.3	9.1	2.1	4.4
10680	5 miles E. of Edisto, Edisto Island.	Brown fine sand, 0 to 12 inches.	.2	.7	.8	72.1	14.4	6.1	5.4
10675	Subsoil of 10674	Yellow fine sand, 12 to 36 inches.	.0	.2	.9	82.9	10.0	1.9	3.9
10681	Subsoil of 10680	Yellow fine sand, 12 to 36 inches.	.0	.3	.5	82.8	9.3	3.0	4.0
10677	Subsoil of 10676	Yellow fine sand, 14 to 36 inches.	.1	1.0	1.3	62.9	25.0	5.5	4.1

NORFOLK FINE SANDY LOAM.

The soil of the Norfolk fine sandy loam varies from 4 to 14 or more inches in depth, having a general average of about 10 inches, and is a light to dark brown fine to very fine sandy loam, mellow, and light textured. The surface compacts slightly when wet, but crumbles readily on drying,

The subsoil, usually to a depth of more than 3 feet, is a yellow, reddish, or mottled drab and yellow sandy clay, close textured and massive, plastic and sticky when wet, and somewhat friable when dry.

This type occurs in irregular and scattered areas throughout this region, principally on Charleston Neck, the mainland, and the northern portions of the larger sea islands near the rivers. The seaward limit of its occurrence is quite uniformly throughout the length of the area at from 3 to 5 miles from the coast.

The Norfolk fine sandy loam occurs at all elevations from tide level to 20 or 30 feet above, but the greater proportion of the type lies at the lower elevations, with ridges of sand occupying higher elevations back from tide water. Its surface is generally level or only slightly inclined toward tide water. Depressions in it are usually occupied by swamp, or "black land," while any decided elevation therein gives sand.

No streams of any size originate in or traverse this type. On the banks of the small streams the heavy subsoil is exposed, forming brightly colored spots of heavy land, which, if more extensive, would constitute a new soil type. The soil is relatively thin on the necks of

slight elevation, which are occasionally washed by high spring tides, and in these situations the soil is somewhat heavier than usual.

Natural drainage is very poor, and, except in a few favored localities, artificial drainage is necessary to bring this soil into good condition for cultivation. The surface soil is capable of fair natural drainage, but the subsoil is very impervious, keeping the soil in a nearly saturated condition. The low elevation has seriously retarded natural drainage, but the fall is sufficient in most cases to permit of good results by artificial means. Open ditches are in general use, also some board drains, and a small amount of tiling; all produce satisfactory and profitable results.

The Norfolk fine sandy loam is composed of fine sediments of marine origin, indicating a quiet water deposition. The abrupt differences in texture between soil and subsoil would seem to indicate a lapse of time between their deposition, or a change in the source of derivation of the materials, or in the force of the current effecting their deposition.

Owing to the low elevation and lack of drainage, weathering in this type has gone on only to a limited extent. The subsoil is largely bluish, showing iron salts in a low state of oxidation. In situations more favorable to drainage the subsoil has attained a bright yellow or orange color from more advanced weathering. In its natural state the soil is a light-brown color, except for a slight covering of fresh mold, but where long cultivated it has attained a rich brown color to a considerable depth and is more loamy. Pine, liveoak, scrub oak, gum, sycamore, hickory, and dogwood are the natural forest growth on this type. Very little longleaf pine is found on it, as the soil is not naturally adapted to this kind of timber.

The principal crops grown are cabbage and potatoes, and so exclusively that it is quite generally known locally as "cabbage land."

Yields vary from 150 to 250 crates of cabbage per acre, not including the plants which do not head and are sold for greens, adding considerably to the value of the crop. From 1 to 2 tons of high-grade fertilizer is added per acre to produce the above yields, and the crop is followed by corn, generally without fertilization, or by some other truck or general crop, thereby securing two crops each season from the soil. Potatoes are grown for early market and yield from 150 to 300 bushels per acre. Corn yields from 25 to 50 bushels per acre. Some cucumbers, beets, carrots, asparagus, lettuce, strawberries, etc., are also grown. The latter crops are more general around Charleston and the adjacent mainland.

Differences in yield are slight and depend more on drainage, fertilization, and cultivation than on the natural qualities of the soil, which is quite uniform throughout the entire area. Some Sea Island cotton is produced successfully on well-drained or tile-drained areas,

the yield comparing favorably with that from the Norfolk fine sand. It is not so important a crop on the fine sandy loam as on the fine sand.

The Norfolk fine sandy loam is adapted to a wide range of the heavier truck and general crops which are suited to this climate and elevation. The long-staple cotton industry might become more general on this soil by careful attention to underdrainage. More attention to rotation and a greater variety of crops would likewise be advisable. Green manuring and the use of leguminous crops might will partially replace the heavy applications of mineral fertilizers at present so general. Pears, peaches, and plums of fine quality are produced, but the trees are said to be short lived and subject to disease, which might be largely overcome by proper treatment.

The following table shows the texture of typical samples of this soil:

Mechanical analyses of Norfolk fine sandy loam.

No.	Locality.	Description.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
10652	Youngs Island...	Fine sandy loam, 0 to 10 inches.	0.4	1.0	1.4	37.5	26.8	26.2	6.5
10654	Martins Point, Wadmalaw Island.	Brown fine sandy loam, 0 to 10 inches.	.2	.6	.7	31.4	30.9	26.8	9.4
10656	1 mile NW. of Edisto, Edisto Island.	Brown fine sandy loam, 0 to 12 inches.	.2	.7	.7	31.4	38.8	28.1	10.1
10653	Subsoil of 10652..	Sandy clay, 10 to 36 inches...	.1	.7	2.0	48.5	18.6	9.1	20.7
10657	Subsoil of 10656..	Sandy clay, 12 to 36 inches...	.0	.2	.7	28.0	24.2	23.8	23.1
10655	Subsoil of 10654..	Yellow sandy clay, 10 to 36 inches.	.0	.3	.4	25.5	25.8	19.7	28.3

NORFOLK SAND.

The soil of the Norfolk sand, as found in this area, consists of a light-brown or yellowish soil, composed mainly of coarse to medium sand particles and extending to an average depth of 12 inches. A small amount of iron concretions is occasionally found on the surface and mingled with the soil and subsoil, the proportion being greater in the subsoil, but not to an extent sufficient to affect the soil. Otherwise the type is uniform, but grades slowly into the surrounding types. The subsoil extends to depths greater than 3 feet, and consists mostly of coarse to fine grade sands of a yellowish color and similar in character to the soil. Occasionally it holds a small amount of silt in the lower depths, and is then slightly more loamy. The

type in general is loose and incoherent, and furnishes the only sand in the area coarse enough for building purposes. From the presence of the iron concretions the type is locally known as "gravel land."

The Norfolk sand occurs in one long, nearly continuous area across Edisto Island, having a direction nearly parallel with the coast and an average width of nearly half a mile. In no other section of this area do sands of so coarse a texture occur. The Norfolk sand here occupies a gentle, rather well-defined ridge, elevated a few feet above tide marsh and sloping away on each side into the other types of the area, with which it blends for a considerable distance. It is no more marked or well defined than many of the fine-sand ridges throughout the area, and is of no greater elevation. From the nature of its component materials, the surface is naturally well drained, and the whole type offers little resistance to the movement of soil moisture. The water table, however, is so near the surface that the subsoil is often moist or wet at no great depth. No streams are found on this type, but rain water percolates rapidly through it, and oozes out in springs and marshes at the base of the ridge. In the cultivation of deep-rooted crops, like the long-staple cotton, to secure the best results it is generally necessary to lower the water table by underdrainage.

The type is of sedimentary origin and indicates a deposition from stronger currents than those which gave rise to the other types of the area. No explanation is suggested for the occurrence of this solitary ridge of comparatively coarse material in this broad expanse of fine sediments. On account of its loose and open texture, weathering has proceeded to a considerable extent, leaching and altering the iron and other soluble matter. Consisting so largely of silica, little change has been wrought in the texture of the type, the slight differences between soil and subsoil having been brought about mainly by cultivation and the incorporation of vegetable matter.

Sea Island cotton is almost the only crop grown on this type, and no differences in yield or quality are noticed between fields on this type and on the Norfolk fine sand. It is well adapted to the crop, and under proper cultivation will produce 300 pounds to the acre. Some sweet potatoes, truck, and general crops are grown, yielding on the average about as well as on the Norfolk fine sand. The acreage of other crops is too small to form an accurate estimate of the natural productiveness of the Norfolk sand here. It is suited to early light truck and cotton, but less suited to general crops. The yields and quality of the cotton would seem to be more dependent on cultivation and climatic conditions than on slight differences in the actual physical texture of the soil.

The following table shows the texture of typical samples of the soil and subsoil of this type:

Mechanical analyses of Norfolk sand.

No.	Locality.	Description.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
10691	1¼ miles SE. of Edisto, Edisto Island.	Light-brown coarse and fine sand, 0 to 12 inches.	3.2	26.9	9.2	49.2	5.5	1.7	4.2
10689	3 miles S. of Edisto, Edisto Island.	Coarse and fine sand, 0 to 12 inches.	2.7	21.3	6.3	53.3	9.9	1.7	4.7
10692	Subsoil of 10691	Yellow coarse and fine sand, 12 to 36 inches.	3.4	25.3	8.9	50.6	4.6	1.8	5.3
10690	Subsoil of 10689	Coarse and fine sand, 12 to 36 inches.	3.2	20.9	5.8	51.1	9.6	2.7	6.5

PORTSMOUTH FINE SANDY LOAM.

The soil of the Portsmouth fine sandy loam varies in depth from 8 to 18 inches, averaging 12 inches, and is a black or rust-brown mucky fine sandy loam, compact, wet, and heavy. A relatively large proportion of organic matter is present in all stages of decomposition, imparting to the soil the deep color. This constituent gradually disappears with continued cultivation, the soil becoming lighter in texture and the sand content more pronounced.

The subsoil is usually a mottled drab and yellow sandy clay, massive and sticky, and extends to a depth of more than 36 inches. Occasionally the subsoil is underlain at depths slightly less than 36 inches by a layer of gray or white very fine sand, and where the type occurs within sand areas the subsoil often consists entirely of sand and has a bleached appearance.

This type includes the fresh-water swamps and marshes of the area, which are filled with standing water the greater part or all of the year and covered with a heavy growth of cypress, gum, and magnolia, together with other water-loving trees, shrubs, and undergrowth. Loaded down with masses of gray Spanish moss and outlined against the clean growth of pine which surrounds them these trees form a distinctive feature of the landscape. But little of the area of this soil is cleared and only a small percentage is under cultivation.

The type occurs in narrow bands along all the fresh-water streams, around the heads of tide marshes beyond salt-water limits, and in large areas inland at the foot of sand ridges, where it is formed by seepage. The areas are of irregular outline and follow the direction of natural surface drainage.

The Portsmouth fine sandy loam is characterized by level, depressed, or inclined surface features, the inclination being always in the direction of the longest axis of the area It is found at all elevations above tide level, but always a little lower than the Norfolk fine sand or other adjacent agricultural types. Most of the fresh-water streams traverse this type with very slight fall, and any elevations in it are occupied by some other soil type.

Lack of drainage is responsible for the existence and peculiar characteristics of the Portsmouth fine sandy loam, which owes its origin to swamp and marsh development on the Norfolk fine sand and Norfolk fine sandy loam, which has so modified the texture, appearance, and crop value by the accumulation of decaying vegetable matter and the effect of the organic acids derived therefrom on the soil particles as to form a distinct type of soil.

In most cases drainage is possible and the fall sufficient to insure complete reclamation of large areas. Some large tracts on James Island have been drained and will soon form desirable farm lands. Elsewhere in the area little has been done in this direction beyond a little clearing around the edges. Much valuable timber, at present inaccessible with ordinary lumbering conveniences, remains in the swamps.

The mineral particles which compose this type were laid down as a marine sediment, and are identical in origin and manner of deposition with those of the Norfolk fine sand and Norfolk fine sandy loam. On account of its saturated condition atmospheric weathering has been very limited, but chemical changes have resulted from the liberation of organic acids from the excess of vegetable matter on the surface and in the soil. These organic remains have made the soil compact, heavy, and mucky.

Only a small percentage of this type is cleared, and crop interests on it are limited. Irish potatoes are successfully grown when the season is dry enough at the time of planting; otherwise the seed rots before sprouting. Cabbages do well and are perhaps best suited to the type of any crop at present grown on it. Cotton does fairly well on fields that have been well drained, but is very liable to disease. The acreage of cotton on this type is insignificant. Small patches of rice are grown for home consumption on wet areas, also of green peas. Corn gives a fair yield in favorable situations.

The Portsmouth fine sandy loam is well adapted to onions, blackberries, and dewberries, and where favorably situated as regards shipping facilities their production would be profitable. Drainage improves this soil type. In most cases the value of the timber would more than balance the cost of drainage, but concerted action would be needed to accomplish much in that direction.

The following table shows the texture of typical samples of this soil:

Mechanical analyses of Portsmouth fine sandy loam.

No.	Locality.	Description.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
10662	West side of James Island.	Black fine sandy loam, 0 to 12 inches.	0.2	1.4	1.6	43.6	16.2	24.8	12.1
10666	2 miles N. of Youngs Island.	Black fine sandy loam, 0 to 14 inches.	.3	1.5	2.0	42.7	15.5	24.9	12.9
10663	Subsoil of 10662	Yellow sandy clay, 12 to 36 inches.	.2	.6	1.0	38.7	12.7	16.5	30.4
10667	Subsoil of 10666	Yellow mottled clay, 14 to 36 inches.	.0	.2	.8	44.0	10.1	11.3	33.4

GALVESTON FINE SAND.

The soil of the Galveston fine sand, to a conventional depth of 12 inches, consists of a light-gray fine sand, containing varying amounts of shell fragments. It is very loose and incoherent, and contains little coarse material and almost no silt or clay. The sand particles are well rounded.

The subsoil is similar in texture to the soil, but usually contains less shell fragments, and has thin strata of black hornblendic material from a few inches to a foot in thickness. The subsoil is usually saturated at slight depths. No line of demarcation is observed between soil and subsoil.

This type occurs only along the sea front, in narrow bands from Morris Island to Bay Point. It rises in a gentle slope from the shore line back beyond the limit of wave action, where it forms low dunes, and descends inland by a gentle slope to the tide marsh and other types which join it. This type forms the familiar beaches of the Atlantic and Gulf coasts and is very uniform in texture. In this area it does not rise more than 20 feet above present tide level. The soil has thorough natural drainage, but the subsoil is always moist at slight depths. Its texture offers little resistance to the movement of soil moisture.

The Galveston fine sand is of marine sedimentary origin and of comparatively recent date. It is being deposited by wave and tide action even at the present time along the seacoast. No changes have taken place since deposition, and it scarcely comes within the definition of a soil, being almost pure rock fragments, lacking in organic and readily soluble matter.

None of the type is cultivated. A few bushes, cedars and yucca, make a stunted growth on the dunes, and farther inland, beyond the reach of the salt water, dense groves of palmetto and bay trees thrive.

The palmetto trees are a source of profit from their timber, which is much used for piling, and the leaves find a sale in the market for ornamental purposes.

The following table shows the texture of typical samples of the soil and subsoil of this type:

Mechanical analyses of Galveston fine sand.

No.	Locality.	Description.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
10682	Bay Point	Light, gray fine sand, 0 to 12 inches.	0.1	1.7	2.3	89.5	5.6	0.3	0.4
10683	Subsoil of 10682	Gray fine sand, 12 to 36 inches.	.1	1.3	2.4	88.9	6.9	.2	.3

GALVESTON CLAY.

The Galveston clay is the familiar salt marsh common along the Atlantic and Gulf coasts and the bays and indentations of the sea.

The soil has an average depth of 12 inches and consists of dark-brown clay, wet, heavy, and plastic. In this area, around its inland limits much of it has been modified by the fine sands blown and washed into it from the surrounding soil types. Away from these influences it is uniformly a heavy clay, mixed with reeds, grass, roots, and decaying vegetable matter.

The subsoil from 12 to 36 inches is either a bluish silt and clay or consists almost wholly of roots. In composition it is soft and plastic, having the consistency of mortar; but on drying it becomes hard and massive. Roots and peat are always present in varying proportions, the latter frequently in a definite strata. The subsoil is often underlain below 3 feet by a layer of dense, massive blue clay.

The Galveston clay borders all the salt-water streams and channels of the area, is of wide extent near the coast, and extends in narrow, tortuous areas far inland to the limit of salt tides. Always level or only very slightly inclined toward water, and submerged by every high tide, it is totally lacking in natural drainage.

The areas of the Galveston clay are cut by innumerable winding salt-water channels and are almost impassable. When diked to exclude the salt water, and drained, it becomes a compact clay soil, brown when wet and gray when dry. Reclamation is feasible on

large areas near the inland limits of salt water. The average rise and fall of the tide in this section being from 5 to 6 feet, considerable drainage is afforded at ebb tide. Some of the type has been thus diked and reclaimed on Jehossee Island and vicinity and is used for rice under irrigation. Some reclaimed areas have been abandoned as a result of changed conditions since the civil war. Large cypress and cedar stumps and roots occurring in some of the tide marshes indicate that recent changes in elevation have taken place and the salt marshes have encroached on former fresh-water areas and lands. A plantation survey, dated 1808, shows and describes as cypress swamp what is now an extensive tide marsh between Wadmalaw and Johns islands. In other sections of the area saltbushes indicate the positions of former tide marshes which are beyond the reach of recent tides, showing unequal movements of the land surface.

The Galveston clay is of sedimentary origin, being a recent alluvium deposited by salt tides in quiet waters, and consists of fine particles subsiding from the thin layer of quiet water mingling with the roots and stems of reeds and water-loving plants. Little change has taken place since sedimentation, atmospheric weathering being impossible. After reclamation the type compacts to a heavy, dense soil, difficult to till but well adapted to the production of rice.

In its natural condition it supports only saltbushes, reeds, and a variety of cedar. The reeds are sometimes cut and used for bedding, stable absorbent, and composting. Marsh mud is itself used as a fertilizer, mainly for physical benefit on light soils; but it is situated close to phosphate deposits in this area, and is claimed by many to contain a valuable proportion of that mineral.

Until land attains a higher value, most of the type will remain in its present condition of inaccessible marsh.

The following table shows the texture of this type:

Mechanical analyses of Galveston clay.

No.	Locality.	Description.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
10685	Church Flats	Brown clay, 0 to 12 inches	0.2	0.7	0.6	14.2	7.2	31.3	45.4
10687	Bees Ferry, Ashley River.	Dark, brown clay, 0 to 12 inches.	.1	.7	.7	14.8	8.7	25.9	49.0
10686	Subsoil of 10685	Blue silt and clay, 12 to 36 inches.	.1	.1	.7	14.9	10.7	34.2	39.3
10688	Subsoil of 10687	Blue silt and clay, 12 to 36 inches.	.0	.1	.2	11.5	8.8	33.0	46.2

AGRICULTURAL METHODS.

Although the land holdings are large and the planters few in number, the cultural methods employed in growing the various crops of the area are fairly intensive. This is made necessary by the character of the principal products, and it is possible by reason of the sufficiency and cheapness of field labor.

From the low, level character of the land and consequent insufficiency of natural drainage, ridge culture is almost exclusively practiced on all crops grown, thereby enabling a certain latitude to be secured in cultural control of surface moisture conditions, the ridges being leveled by plowing down in dry spells and again thrown up should prolonged wet seasons ensue.

A single horse and light implements are in general use, both for plowing and fitting seed beds and for subsequent cultivation. Plowing is usually from 3 to 6 inches in depth, two furrows being turned together, forming a planting ridge and leaving a trench between to secure rapid drying of the field. The surface soils of most of the land under cultivation are so mellow and friable that little harrowing is necessary, and for general crops not planted in ridges the disk harrow is often used instead of the plow.

Sea Island, or long-staple, cotton is the chief and almost exclusive crop on the Norfolk fine sand and Norfolk sand, and is found to a slight extent on the Norfolk fine sandy loam and Portsmouth fine sandy loam. It requires cultural methods peculiar to itself to produce a good yield and fine quality, and while these methods vary within narrow limits with the fancy and experience of the individual grower, they are fairly uniform throughout the area and yields and quality vary but little.

The cotton fields are generally planted every other year, and in alternate years are allowed to lie fallow and are used as pastures for stock, which, in feeding on the stalks, follow the rows and by their continual tramping compact the trenches or alleys between, which are to form bottoms of future cotton rows.

In preparing the fallow fields for the succeeding crop the stalks from adjoining rows are " listed " or hoed onto the compacted alley, fertilizers are applied, and the row ridged up over the former alley by turning double furrows with a plow. The special aim is to secure the early maturity of the boll, so as to prevent its loss from early frost in the fall. The natural habit of the plant is to form a perennial shrubby growth with scant fruiting. To accomplish the desired result the prolonged growth of the plant must be checked and its " blowing " or fruiting hastened. The compacted bottom of the row facilitates this by confining the root zone. Liberal fertilization is also given to hasten maturity. Underdrainage is practiced with the

specific object of securing a dry root zone during the fruiting season, in order that the plant will not be encouraged into rank or weedy growth and that its bearing may be stimulated. Early maturity has doubtless, by these various means of encouragement practiced through a long period, tended to become more and more an ingrained character of the plant itself, transmitted through its seed, and thus by cultural methods has the natural habit of the plant been radically changed, its present manner of growth and time of fruiting being highly artificial.

The seed is planted by hand during the latter part of March or early part of April, according to climatic conditions, in rows 5 feet apart, using about 35 pounds of seed per acre. The plants are subjected to thorough surface cultivation until too large. Picking begins in the early fall and lasts sometimes until nearly the end of the year, the crop demanding attention for nearly nine months.

One thousand pounds per acre is the average amount of fertilizer applied. A proportion in general use is 400 pounds cotton-seed meal, 300 pounds kainit, and 400 pounds dissolved phosphate. Nitrate of soda, fish scrap, and marsh mud are sometimes applied. Peas are frequently sown in the cotton, and aside from the profit derived from the crop, are of benefit to the soil, and serve the additional purpose of keeping the field free from nut grass, by so shading the ground after the cotton leaves have wilted that the nut grass is unable to mature seed or form the little burrs or nuts by which it propagates, being thus eventually killed out.

The cabbage fields are plowed in ridges by turning two furrows together, rows being formed 2½ feet apart. About 1,500 pounds per acre of high-grade fertilizer is applied before planting. The young plants from the seed bed are set from 12 to 18 inches apart in the row. They receive frequent tillage with diamond-tooth cultivators, sweeps, and occasional subsoiling to a depth of from 8 to 12 inches with a small subsoil plow, for aeration and removal of surplus moisture. Occasional applications of nitrate of soda and commercial fertilizers are made as a top dressing to force the growth, the total application ranging from 2,000 to 4,000 pounds per acre. The cabbage crop is almost entirely grown on the Norfolk fine sandy loam, as it requires a large moisture supply retained near the surface. It is followed the same season, usually by corn as a general crop, and in a smaller acreage by cucumbers. The following season potatoes are planted after the cabbage, giving four crops in two seasons. Sometimes a field is left in fallow one season and the natural growth turned under.

Methods in use on potatoes, corn, cucumbers, beets, carrots, and market garden crops do not differ materially from practices in other sections and do not demand special consideration.

Strawberries are cultivated in narrow matted rows, mulched with pine straw, which is raked off from the plants in early spring by hand labor. Large amounts of stable manure, compost, and nitrate of soda are applied to this crop.

Irrigation is practiced on the rice lands on Jehossee Island. Only a small acreage of this important crop falls within the limits of this area, and not enough attention is paid to this crop to warrant a discussion of its culture in this report. Recent attacks of blight have seriously threatened the existence of the industry in this section.

AGRICULTURAL CONDITIONS.

Agriculture in the Charleston area is carried on principally by white planters of a high degree of intelligence, culture, and refinement. They are almost without exception in comfortable or affluent circumstances, favored with an equable climate and easily tilled, responsive lands, enjoying an ideal country life, with time and opportunity for research and experimental work in agricultural lines, of which opportunity many of the foremost have availed themselves, with much profit to the community. The plantations are generally worked by the owners, and most of them are free from incumbrance. Many are leased out in small parcels to colored people, who make payment in a portion of the crop, or, more frequently, in a stated amount of labor performed on lands worked by the owner and lessor.

The farms are of large size, running from several hundred to several thousand acres in extent, but usually only a small acreage of each plantation is under cultivation, a large part of the area being in forest or old fields. It is not uncommon to see old cotton rows in fields now covered by forests of thirty to forty or more years growth. James Island is probably the best cleared area of the section, closely followed by Edisto Island, and then by Wadmalaw Island. The part of mainland included in this survey is cleared only in narrow strips along main roads, and the water front and Johns Island are uncleared except for occasional small areas along the shore. The interior, with its dense pine forests and mazes of cypress swamps, is almost impenetrable. Few white people live on this island, and the large colored population derives an existence from agricultural pursuits and the natural food supply of forest and stream.

Field labor is done by colored people entirely, who are paid about 50 cents a day. Labor is adequate but unskilled. Few hands are employed by the day or month for a cash wage, most of the help being " contract hands " who have been furnished a cabin, firewood, and the use of a piece of land in consideration of their working two days a week for their employer. They, with the help of other members of their family, make a crop on the land furnished them in their spare

time. Contract hands often put in more than the stipulated time, and are paid at the prevailing rate in plantation checks good for their face value at the " commissary " maintained on the plantation.

The farm buildings consist of the large, roomy plantation house of two or three stories, set high above the ground, facing the south, and having ample piazzas on that side and a more or less imposing flower garden in front. The houses are all built light and airy for summer comfort, and afford little protection from the occasional cold spells of the winter season. Open fireplaces furnish the little heat needed and add much to the cheerfulness of the long evenings. The houses are often approached by long avenues, lined on each side with magnificent liveoaks, their spreading limbs hung thickly with Spanish moss and ferns. The whitewashed negro cabins, with their stick-and-clay chimneys, are ranged around the edges of the fields or line the lanes leading to them. The dock and warehouse are a necessary part of the farm equipment, as most of the plantations are located on navigable channels, and most of the supplies are received and shipments made by water. Tool sheds, a few stalls for the stock, the commissary, and, on the larger plantations, a cotton gin, complete the equipment. No large barns, and few fences, are seen. Implements are of modern pattern, but chiefly light and intended for one-horse cultivation.

Because of the character of the labor much of the work is done by hand implements which in other sections would be accomplished with teams and team implements. White foremen are generally employed, and experienced men are required to handle the class of labor under their charge. The laborers seem contented, and often remain many years or a lifetime on the same plantation, though some of the more enterprising find employment at some trade in the city.

The crop interests of the Charleston area can not be called diversified, as they naturally fall into but two classes—cotton and truck—other general crops representing but a small acreage.

Long-staple or Sea Island cotton is preeminent in interest among the products of the area. Growing only at an altitude slightly above sea level, and within a narrow range of climatic conditions, it here reaches its perfection of length and quality of staple and yield near the northern limit of its zone of growth. Originally a perennial shrub bearing scanty bolls, it has been made by cultivation to put forth more and earlier fruit pods and longer, silkier staple, until now the seed carries within it these artificial and ingrafted qualities which quickly degenerate when it is taken from its accustomed surroundings to a different climate or elevation. It is best adapted and most widely grown on the type known as Norfolk fine sand, although no difference can be detected in adaptation between that type and the Norfolk sand. It is grown to some extent on the Norfolk fine sandy loam, which is not so well adapted to it unless thoroughly under-

drained, because of the larger moisture capacity of its subsoil and consequent tendency to prolong the growth and delay maturity. Underdrainage is beneficial because the ready percolation of water through the soil into drains bears away the hardpan which tends to accumulate or "clog" just above the water table on undrained lands. This permits soil moisture (not free water) to be conveyed back to the plants through these opened channels, instead of remaining dammed in beneath the hardpan. At the same time the water table is lowered, and since the plant and upper soil are uniformly supplied with moisture, the roots are not stimulated into an excessive growth toward the water table, and the growing season thereby lengthened. For this same reason the "gravelly" subsoil is good for long-staple cotton. (Soils containing iron concretions are here called "gravelly lands".) Yields vary from 200 to 400 pounds per acre, 300 to 350 being considered a good yield. The product is ginned by specially constructed gins, using no saws to cut the fiber, into "bags," which are not subjected to nearly as much pressure as is used in baling short-staple cotton, as this would break the fiber and injure the quality. Nearly all the crop is exported, the last season's product bringing from 25 to 60 cents a pound. Only a few lots from Edisto Island brought the top price.

Most of the growers contend that it is more profitable to raise a large yield of the medium quality than a smaller yield of the highest quality, which demands so much expert care and attention. The crop yields an average of 1,000 pounds of seed per acre, having a value of about $1 per bushel of 44 pounds for seed purposes, or $18 a ton for milling purposes. The best planters find ready sale for theirs for seeding, as northern-grown seed is much in demand by growers farther south, from its tendency to an earlier maturity. The crops grown by the colored people have no established quality, and the seed is marketable only for milling. Recent high prices have induced some to plant short-staple cotton on the sea islands, and many growers have expressed a fear that this may result in ruining the reputation of their Sea Island cotton seed, or eventually destroying the peculiar qualities of the long-staple crop here.

The progress of the Sea Island cotton industry has not been without its vicissitudes. At one time the blight or "wilt" threatened its complete destruction and many experiments and remedies were tried, resulting in failure or only scanty success. It is due chiefly to the efforts of Mr. Elias Rivers, a scientific planter on James Island, seconded by the efforts of the Bureau of Plant Industry of this Department, that this trouble has been largely overcome. By a careful and intelligent selection of seed from plants immune to the disease he has successfully combated it, and others have quickly profited

by his success. These immune plants have a tendency to make a little coarser growth and bear a trifle larger seed. The cotton of finest quality is most susceptible to blight.

"Blue cotton" is a disease that has given trouble in some sections. The plant attains a good growth, and then falls down without bearing and sheds its pods. The cause is attributed to an excess of iron in the soil, and large concretions are often found on affected land. It may possibly be due to the acidity of iron sulphate and associated sulphuric acid and humic compounds which have accumulated. It is claimed that the "fillers" (body) of commercial fertilizers contain iron and sulphuric acid, and that this increases acidity, becoming thereby a contributing cause of the disease. The remedies are: Lime and underdrainage to facilitate leaching of humic compounds, applications of salt wash, and thorough composting of applied manures to prevent the accumulation of raw organic matter.

Last season some 9,000 bales of Sea Island cotton were ginned in South Carolina, nearly all of which was produced within the limits of the present survey, and the industry is now in a thriving condition, but with no tendency to an increased acreage.

Of the truck crops cabbage is the most important, followed by potatoes, strawberries, cucumbers, and beets. Of less importance are asparagus, lettuce, radishes, carrots, and melons. The cabbage crop is confined almost exclusively to the Norfolk fine sandy loam, with a small acreage on the Portsmouth fine sandy loam, and the areas in this crop are located on the water fronts of the inland rivers from Charleston to Slanns Island, except for a few miles from Johns Island ferry to New Cut, on Wadmalaw Island, and a few small areas on James and Johns islands. Very little cabbage is grown on Edisto Island. The industry centers at Meggett station, where over 5,000 acres are planted this season (1904). One field of 750 acres was a beautiful sight at the time of the survey, when cutting was just commencing. Two crops are grown, one maturing for the spring shipment, which is of exceptional importance. Several varieties are grown, but the bulk are of the Wakefield type, the favorite being the Charleston Wakefield, a variety orignated by Mr. F. W. Towles, of Martins Point, who is the pioneer truck grower of the section. The heads are cut and trimmed in the field, drawn to the warehouse or packing shed, and packed in crates containing about 100 pounds, net, of cabbage. These crates bring from $1.50 to $5 each on the market. Yields vary from 150 to 230 crates per acre. Crates cost from 12 cents to 15 cents each and are not returned. Loose heads are disposed of as greens, and leaves and trimmings fed to stock. Northern-grown seed is in general use, to secure earliest maturity. Millions of young

plants are shipped from the seed beds here to other growers farther north and bring about $1.50 per thousand.

Early potatoes are produced extensively on the cabbage lands in rotation. The Early Rose is the favorite variety, and is grown from northern-grown seed, yielding an average for the entire area of 100 bushels per acre. Many growers secure regularly from 200 to 250 bushels per acre.

Asparagus was formerly much grown, but the acreage is rapidly decreasing on account of changed market conditions. It is grown mainly on the Norfolk fine sand. The average yield is 25 crates per acre. Strawberries are extensively grown around Charleston on the Norfolk fine sandy loam. Sweet potatoes are grown on the sandy soils. They yield an average of 200 bushels per acre, and are used largely as stock feed and for the table, few being shipped from this section.

The Atlantic Coast Line Railroad traverses the mainland of the area, with several spurs and branches into the trucking section. The Southern Railway also enters Charleston, and the Clyde Line steamers make frequent trips to northern ports. Transportation to and from the islands is entirely by boat, several steamers making regular trips during the market season.

With few exceptions, the roads are very sandy, and there is no construction material at hand aside from oyster shells.

Cotton is exported, and the truck crops are shipped mostly by rail to the northern markets, even as far as Boston and Providence. An effort is being made to develop the western market for cabbage and potatoes, and an association of the principal growers has recently been formed in the endeavor to decrease internal competition and to prevent ruinous prices and the oversupplying of markets.

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U.S. DEPT. OF AGRICULTURE
BUREAU OF SOILS
MILTON WHITNEY, CHIEF

SOIL MAP

SOUTH CAROLINA
CHARLESTON SHEET

SOIL PROFILE
(3 feet deep)

Norfolk sand
S
S

Galveston fine sand
S
S

Norfolk fine sand
S
S

Norfolk fine sandy loam
Sdy
Gs

Portsmouth fine sandy loam
Sdy
Gs

Galveston clay
C
C

LEGEND

S Sand
S Fine sand
Sdy Fine sandy loam
Sdy Sandy clay
C Clay

LEGEND

Ns Norfolk sand
Gs Galveston fine sand
Nf Norfolk fine sand
Nsl Norfolk fine sandy loam
Ps Portsmouth fine sandy loam
Gc Galveston clay

Soils Surveyed by
F.E. Bonsteel and E.F. Carr.
1904.

Field Operations
Bureau of Soils
1904.

Scale 1 inch = 1 mile